

In re Patent Application of:
PAVEL SEBOR
Serial No. 10/621,070
Filing Date: 7/16/2003

In the Claims:

1. (Original) An apparatus for cleaning surfaces submerged in a fluid, the apparatus comprising:

a housing having a single flow passage extending from an inlet to an outlet for a flow of fluid and debris therethrough, wherein a partition wall extends into the single flow passage such that the flow of fluid and debris are constrained to pass through an opening formed thereby and pass to the outlet, which outlet is adapted for connection to a suction source;

a flexible plate carried proximate the inlet for engaging a submerged surface to be cleaned; and

a valve pivotally carried within the flow passage for interrupting fluid flow therethrough during an oscillation thereof between a seated position for interrupting the flow therethrough to an unseated position permitting the flow therethrough, wherein a suction of the fluid through the single passage causes an oscillating of the valve between the seated and the unseated positions and a movement of the housing across the submerged surface to be cleaned; and

a retractable element moveable between a valve distal end and the partition wall for reducing a gap formed therebetween, thus substantially limiting the flow of the fluid and debris to only one side of the valve.

2. (Original) An apparatus according to claim 1, further comprising the retractable element dimensioned wherein the fluid flow through the single passage causes the retractable element to have slidably engagement between the valve distal end and the partition wall during the oscillation of the valve.

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3. (Original) An apparatus according to claim 1, wherein the single flow passage is defined by opposing top and bottom walls in combination with opposing sidewalls, and wherein the valve contacts the bottom wall in the seated position and oscillates between the seated position and a stop at the top wall.
4. (Original) An apparatus according to claim 3, wherein the top wall comprises an access opening enclosed by a detachable cover, the access opening providing access to the valve.
5. (Original) An apparatus according to claim 4, wherein the partition wall is integrally formed with the cover.
6. (Original) An apparatus according to claim 1, further comprising a pivot pin carried by the housing, wherein a proximal end of the valve is pivotally connected to the pivot pin for rotation thereabout.
7. (Original) An apparatus according to claim 1, wherein the valve comprises: an elongate arm having a proximal end for pivoting the valve thereabout; and a head portion at a distal end of the elongate arm, the distal end operable upstream the proximal end.
8. (Original) An apparatus according to claim 7, wherein the head portion includes a slot extending therethrough for slidably receiving the retractable element therein.

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9. (Original) An apparatus according to claim 8, wherein the head portion includes a protrusion extending outward therefrom for slidably receiving the retractable element thereon.

10. (Original) An apparatus according to claim 1, wherein the partition wall includes a slot extending therethrough for slidably receiving the retractable element therein.

11. (Original) An apparatus according to claim 1, wherein the partition wall includes a protrusion extending outward therefrom for slidably receiving the retractable element thereon.

12. (Original) An apparatus according to claim 1, wherein the retractable element is operably attached to one of the valve and the partition wall for the slideable engagement therebetween.

13. (Previously Presented) An apparatus according to claim 1, wherein the flexible plate comprises:

an upper surface;
a lower surface for contacting the surface to be cleaned;
a peripheral portion including a plurality of tongues outwardly extending thereabout, wherein each of the plurality of tongues includes a lower surface portion for contacting the surface to be cleaned and a portion in a spaced relation with the surface to be cleaned during operation of the apparatus, thus upwardly lifting an outer most periphery of the plate from the surface to be cleaned.

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14. (Previously Presented) An apparatus according to claim 13, further comprising at least one rib integrally formed with the upper surface of the flexible plate, wherein at least one of the plurality of tongues includes the at least one rib for reinforcing the portion in a spaced relation with the surface to be cleaned.

15. (Original) An apparatus according to claim 13, further comprising a plurality of reinforcing elements integrally formed with the flexible plate for upwardly contouring the periphery thereof from the surface to be cleaned.

16. (Previously Presented) An apparatus according to claim 15, wherein the reinforcing element comprises a rib integrally formed with the upper surface of the flexible plate, the rib extending outwardly while confined within the peripheral portion of the flexible plate.

17. (Original) An apparatus according to claim 15, wherein the reinforcing element comprises a flange extending along a peripheral edge of the tongue.

18. (Original) An apparatus according to claim 13, wherein the plate further comprises a plurality of slots extending outwardly from a center thereof.

19. (Original) An apparatus according to claim 18, wherein the plate further comprises a plurality of slits with each one of the plurality of slits extending outward from each one of the plurality of slots outward to the periphery.

20. (Original) An apparatus according to claim 18, wherein each of the plurality of slots extend through the periphery.

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21. (Original) An apparatus according to claim 18, wherein each of the plurality of slots is tapered.

22. (Original) An apparatus according to claim 18, wherein each of the plurality of slots is tapered for providing a smaller gap between walls of the slot as the gap approached the periphery.

23. (Original) An apparatus according to claim 18, wherein each of the plurality of slots extends along a first imaginary line centrally position between a second imaginary line passing centrally through each of the plurality of tongues.

24. (Original) An apparatus according to claim 13, wherein the lower surface comprises a plurality of grooves therein extending outward for a center thereof.

25. (Original) An apparatus according to claim 24, at least a portion of the plurality of grooves extends only partially between the center and periphery of the plate.

26. (Original) An apparatus according to claim 13, wherein the plate comprises a plurality of pleats extending outward from a center thereof, each pleat forming a groove within the lower surface and a protrusion within the upper surface.

27. (Original) An apparatus according to claim 13, wherein the plate comprises a plurality of holes extending from the upper surface to the lower surface for modifying a

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suction provided by the flexible plate during operation of the apparatus with the suction source.

28. (Previously Presented) An apparatus for cleaning surfaces submerged in a fluid, the apparatus comprising:

a housing having a flow passage extending longitudinally from an inlet to an outlet for a flow of fluid and debris therethrough, wherein a partition wall extends into the flow passage such that the flow of fluid and debris are constrained to pass through an opening formed thereby; and

a valve operable within the flow passage for interrupting fluid flow therethrough during an oscillation thereof; and

a retractable element moveable generally longitudinally between the valve and the partition wall for reducing a gap formed therebetween.

29. (Original) An apparatus according to claim 28, further comprising the retractable element dimensioned wherein the fluid flow through the passage causes the retractable element to have slidably engagement between the valve distal end and the partition wall during the oscillation of the valve.

30. (Original) An apparatus according to claim 28, wherein the housing comprises an access opening enclosed by a detachable cover, the access opening providing access to the valve.

31. (Original) An apparatus according to claim 30, wherein the wall is integrally formed with the cover.

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32. (Original) An apparatus according to claim 28, further comprising a pivot pin carried by the housing, wherein the valve is pivotally connected to the pivot pin for rotation thereabout.

33. (Original) An apparatus according to claim 28, wherein a distal end of the valve includes a slot extending therethrough for slidably receiving the retractable element therein.

34. (Original) An apparatus according to claim 28, wherein a distal end of the valve includes a protrusion extending outward therefrom for slidably receiving the retractable element thereon.

35. (Original) An apparatus according to claim 28, wherein the partition wall includes a slot extending therethrough for slidably receiving the retractable element therein.

36. (Previously amended) An apparatus according to claim 28, wherein the partition wall includes a protrusion extending outwardly therefrom for slidably receiving the retractable element thereon.

37. (Original) An apparatus according to claim 28, wherein the retractable element is operably attached to one of the valve and the partition wall for the slidable engagement therebetween.

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38. (Previously Presented) An apparatus for cleaning surfaces submerged in a fluid, the apparatus comprising:

a housing having a flow passage extending longitudinally from an inlet to an outlet for a flow of fluid and debris therethrough;

a valve operable within the flow passage for interrupting fluid flow therethrough during an oscillation thereof; and

a flexible plate carried proximate the inlet for engaging the surface to be cleaned, the flexible plate having:

an upper surface;

a lower surface for contacting the surface to be cleaned; and

a peripheral portion including a plurality of tongues extending outwardly thereabout, wherein each of the plurality of tongues includes a lower surface portion for contacting the surface to be cleaned and a portion in a spaced relation with the surface to be cleaned during operation of the apparatus, thus upwardly lifting an outer most periphery of the plate from the surface to be cleaned.

39. (Previously Presented) An apparatus according to claim 38, further comprising at least one rib integrally formed with the upper surface of the flexible plate, wherein at least one of the plurality of tongues includes the at least one rib for reinforcing the portion of the tongue in the spaced relation with the surface to be cleaned.

40. (Original) An apparatus according to claim 38, further comprising a plurality of reinforcing elements integrally formed with the flexible plate for upwardly contouring the periphery thereof from the surface to be cleaned.

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41. (Previously Presented) An apparatus according to claim 40, wherein the reinforcing element comprises a rib integrally formed with the upper surface of the flexible plate, the rib extending outwardly while confined within the peripheral portion of the flexible plate.

42. (Original) An apparatus according to claim 40, wherein the reinforcing element comprises a flange extending along a peripheral edge of the tongue.

43. (Previously Presented) An apparatus according to claim 38, wherein the plate further comprises a plurality of slots outwardly extending from a center thereof.

44. (Previously Presented) An apparatus according to claim 43, wherein the plate further comprises a plurality of slits and wherein each one of the plurality of slits outwardly extends from each one of the plurality of slots outwardly to the periphery.

45. (Previously Presented) An apparatus according to claim 43, wherein each of the plurality of slots extends through the periphery.

46. (Original) An apparatus according to claim 43, wherein each of the plurality of slots is tapered.

47. (Previously Presented) An apparatus according to claim 43, wherein each of the plurality of slots is tapered for providing a smaller gap between walls of the slot as the gap approached the peripheral portion.

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48. (Original) An apparatus according to claim 43, wherein each of the plurality of slots extends along a first imaginary line centrally position between a second imaginary line passing centrally through each of the plurality of tongues.

49. (Previously Presented) An apparatus according to claim 38, wherein the lower surface comprises a plurality of grooves therein extending outwardly from a center thereof.

50. (Original) An apparatus according to claim 49, at least a portion of the plurality of grooves extends only partially between the center and periphery of the plate.

51. (Original) An apparatus according to claim 38, wherein the plate comprises a plurality of pleats extending from a center thereof, each pleat forming a groove within the lower surface and a protrusion within the upper surface.

52. (Original) An apparatus according to claim 38, wherein the plate comprises a plurality of holes extending from the upper surface to the lower surface for modifying a suction provided by the flexible plate during operation of the apparatus with the suction source.

53. (Previously Presented) An apparatus according to claim 38, wherein the plurality of tongues extend radially outward from a center of the flexible plate.

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54. (Previously Presented) An apparatus according to claim 38, wherein the portion in spaced relation with the surface to be cleaned comprises a contoured lower surface extending from the lower surface portion contacting the surface to be cleaned.